

REMARKS

Applicants appreciate the detailed examination evidenced by the Office Action dated September 26, 2002 (hereinafter “the Office Action”), and the indication of patentable subject matter in Claims 16, 18, 27-29, 41, 47-50 and 61. Applicants have amended Claims 5 and 12 to overcome the rejections under 25 U.S.C. § 112.

Applicants respectfully traverse the rejections of Claims 1-15, 17, 19-26, 30-40, 42-46, 51-60, and 62-65 based on U.S. Patent No. 6,112,325 to Burshtein (“Burshtein”), as this reference fails to disclose or suggest, among other things, a *biased* selection of a code for decoding a signal received at a first station, wherein the biasing is based on a prior communication between first and second stations, more particularly, as clarified by amendments to Claims 1, 31, and 51, a communication “that occurred prior to reception of the signal.” Applicants have amended Claims 21, 45 and 63 to recite determining an extent to which to decode a received signal based on a communication between the first station and a second station that transmitted the signal *that occurred prior to reception of the signal*, which is also neither disclosed nor suggested by Burshtein. Applicants have also amended Claim 12 to clarify the nature of the claimed subject matter such that Claim 12 now recites “identifying the code applied to the first field based on one of the generated estimate of the second field or a combination of the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes, selected based on a confidence in the generated estimate of the second field.” Applicants submit that these recitations, and corresponding recitations of Claims 37 and 55, are neither disclosed nor suggested by Burshtein. Reasons for patentability of the claims are discussed in detail below.

The § 112 rejections are overcome

Claim 5 has amended to recite “automatic repeat request,” as suggested, thus overcoming the §112 rejection of Claim 5. Claim 12 has been amended to clarify that identification of a code can occur based on two bases, i.e., based on an estimate of a field or on a combination of the estimate and respective likelihood metrics associated with respective different decodings, wherein the selection of the identification

technique is based on a confidence in the estimate of the field. Applicants submit that these amendments overcome the § 112 rejection of Claim 12. Applicants have also amended Claim 64 to clarify the nature of the “at least one of list,” thus overcoming the § 112 rejection of Claim 64.

Independent Claims 1, 31 and 51 are patentable over Burshtein

Independent Claims 1, 31 and 51 stand rejected under 35 U.S.C. § 102 as anticipated by Burshtein. As amended, Claim 1 recites:

A method of processing a signal representing information coded according to a code selected from a set of codes, the method comprising the steps of:

- receiving the signal at a first station;
- decoding the received signal according to respective codes of the set of codes to generate respective likelihood metrics associated with respective codes of the set of codes;
- selecting a code from the set of codes based on the respective likelihood metrics, *wherein the selection of the code from the set of codes is biased based on a communication between the first station and a second station that transmitted the signal that occurred prior to reception of the signal at the first station*; and
- decoding the received signal according to the selected code to generate an estimate of the information.

Corresponding apparatus recitations are found in amended Claims 31 and 51.

Such recitations are neither disclosed nor suggested by Burshtein. Rather, Burshtein describes decoding a signal according to a plurality of coding rates and selecting the rate that produces a desired quality. In particular, as shown in FIG. 8 and described in columns 20 and 21 of Burshtein, a frame is analyzed at each of a plurality of rates to produce respective likelihood values for respective ones of the rates (blocks 352, 354). A rate with the best value is then selected (block 356) and used to decode the frame (block 358). If the decoding produces an “allowable” result, the frame is further processed at the selected rate (block 362). If not, the next best rate is selected and used to decode the frame (blocked 364, 366). This process proceeds through a descending hierarchy until the frame is allowed or rejected. A similar process is illustrated in FIG. 5.

The cited portions of Burshtein do not disclose or suggest, however, “selecting a code from the set of codes based on the respective likelihood metrics, wherein the selection of the code from the set of codes is *biased* based on a communication between the first station and a second station that transmitted the signal *that occurred prior to reception of the signal at the first station.*” For at least these reasons, Applicants submit that Claims 1, 31 and 51 are patentable over Burshtein.

Independent Claims 12, 37 and 55 are patentable over Burshtein

Independent Claims 12, 37 and 55 stand rejected under 35 U.S.C. § 102 as anticipated by Burshtein. As amended, Claim 12 recites:

A method of processing a signal representing a first field and a second field, wherein the first field is coded according to a code selected from a set of codes and the second field indicates the code applied to the first field, the method comprising the steps of:

receiving the signal at a first station;
processing the received signal to generate an estimate of the second field;

identifying the code applied to the first field based on a selected one of the generated estimate of the second field or a combination of the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes, wherein selection is based on a confidence in the generated estimate of the second field; and

decoding the received signal according to the identified code to produce an estimate of the first field.

Claims 37 and 55 include corresponding apparatus recitations.

Such recitations are neither disclosed nor suggested by Burshtein. In particular, the Office Action cites column 6, lines 36-38 and 47-60 as teaching “identifying the code applied to the first field based on a selected one of the generated estimate of the second field or a combination of the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes, wherein selection is based on a confidence in the generated estimate of the second field.” However, these passages include no description of “a signal representing a first field and a second field,

wherein the first field is coded according to a code selected from a set of codes and the second field indicates the code applied to the first field” and, therefore, cannot disclose or suggest the claim recitations relating to identification of a code applied to a field. Rather, the passages from Burshtein merely mention that a frame may or may not contain CRC (cyclic redundancy check) information that can be used to determine whether a signal is correctly decoded, and that CRC-including rates should be preferentially tried when trying to determine the rate at which to decode a signal. This CRC is not a field that “indicates the code applied” to another field, e.g., a field that indicates whether 8-PSK or QPSK modulation is applied to transmitted information, as described in exemplary embodiments of the present invention. Rather, as well known to those skilled in the art, a CRC is a redundant version of transmitted data that is used in an error checking process for a signal estimate generated from a received signal. For at least these reasons, Applicants submit that Claims 12, 37 and 55 are patentable over Burshtein.

Independent Claims 21, 45 and 63 are patentable over Burshtein

Independent Claims 21, 45 and 63 stand rejected under 35 U.S.C. § 102 as anticipated by Burshtein. As amended, Claim 21 recites:

A method of processing a signal representing information coded according to a code selected from a set of codes, the method comprising the steps of:

receiving the signal at a first station;

determining an extent to which to decode the received signal based on a communication between the first station and a second station that transmitted the signal that occurred prior to reception of the signal at the first station;

decoding the received signal according to respective codes of the set of codes to the determined extent to generate respective likelihood metrics associated with respective codes of the set of codes;

selecting a code from the set of codes based on the respective likelihood metrics; and

decoding the received signal according to the selected code to generate an estimate of the information.

Claims 45 and 63 include corresponding apparatus recitations.

Such recitations are neither disclosed nor suggested by Burshtein. As an initial observation, Applicants note that the Office Action fails to provide a clear basis for the rejections of these claims, as the rejections of these claims merely paraphrase the claims and state “discussed in respect to other claims” (see Office Action, pp. 11, 16 and 20). No information is given as to the identity of these “other claims” and, for this reason alone, the rejections should be clarified or withdrawn.

Notwithstanding this omission in the Office Action, Applicants further submit that Burshtein does not disclose or suggest the recitations of Claims 1, 45 and 63. For example, as discussed above, Burshtein merely describes decoding a signal at a plurality of rates to determine which produces a desired result. Nowhere does Burshtein disclose or suggest, for example, “determining *an extent to which to decode* the received signal based on a communication between the first station and a second station that transmitted the signal that occurred prior to reception of the signal at the first station.” For at least these additional reasons, Applicants submit that Claims 21, 45 and 63 are patentable over Burshtein.

The dependent claims are patentable

Applicants submit that the dependent claims are patentable at least by virtue of depending from various ones of patentable independent Claims 1, 12, 21, 31, 37, 45, 55 and 63. Applicants further submit that many of the dependent claims are separately patentable.

For example, Claim 2, which depends from Claim 1 and stands rejected as anticipated by Burshtein, recites:

. . . wherein said step of selecting a code from the set of codes is preceded by the step of generating a measure of quality for a channel over which the signal is communicated based on a communication between the first and second stations; and

wherein said step of selecting a code from the set of codes comprises the step of biasing the selection of a code from the set of codes based on the generated measure of channel quality.

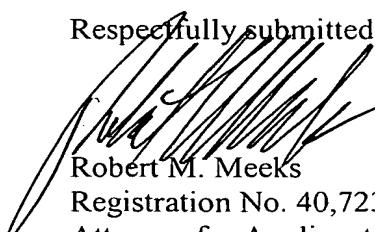
As discussed above, Burshtein does not disclose or suggest biasing a code selection based on a prior communication, much less the specific techniques for biasing recited

in Claim 2. For at least these reasons, Applicants submit that Claim 2 and the apparatus analogs thereof are separately patentable over Burshtein. Similar arguments for separate patentability apply to the specific techniques recited in Claims 3-9 and the apparatus analogs thereof.

As another example, Claim 15, which depends from Claim 12 and also stands rejected as anticipated by Burshtein, recites “wherein said step of decoding the received signal according to respective codes of the set of codes comprises the step of decoding the received signal according to respective codes of the set of codes to an extent that is determined based on prior communication between the first station and a second station that transmitted the signal.” As noted above with reference to the rejections of Claims 21, 45 and 63, Burshtein does not disclose or suggest basing decoding extent on a prior communication. For at least similar reasons, Applicants submit that Claim 15 and the apparatus analogs thereof are separately patentable over Burshtein.

Conclusion

The § 112 rejections have been overcome. Applicants also have shown that the independent claims are patentably distinct from Burshtein, as this reference fails to disclose or suggest, among other things, biasing a code selection based on a prior communication and determining an extent to which to decode a received signal based on a prior communication. Applicants have further shown that several of the dependent claims have separate bases for patentability over Burshtein. Accordingly, Applicants submit that the claims are now in condition for allowance, and respectfully request allowance of all claims in due course. If any informal matters arise the Examiner is encouraged to contact the undersigned by telephone at (919) 854-1400.

Respectfully submitted,

Robert M. Meeks
Registration No. 40,723
Attorney for Applicants



VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1, 5, 12-13, 17, 19-21, 31, 45, 51, and 63-64 have been amended as follows:

1. (Amended) A method of processing a signal representing information coded according to a code selected from a set of codes, the method comprising the steps of:

receiving the signal at a first station;

decoding the received signal according to respective codes of the set of codes to generate respective likelihood metrics associated with respective codes of the set of codes;

selecting a code from the set of codes based on the respective likelihood metrics, wherein the selection of the code from the set of codes is biased based on a [prior] communication between the first station and a second station that transmitted the signal that occurred prior to reception of the signal at the first station; and

decoding the received signal according to the selected code to generate an estimate of the information.

5. (Amended) A method according to Claim 4, wherein said step of communicating a communications status report comprises the step of communicating an ARQ (automatic repeat request) status message between the first and second stations.

12. (Amended) A method of processing a signal representing a first field and a second field, wherein the first field is coded according to a code selected from a set of codes and the second field indicates the code applied to the first field, the method comprising the steps of:

receiving the signal at a first station;
processing the received signal to generate an estimate of the second field;
[choosing to perform one of the following steps to identify the code applied to the first field, based on a confidence in the generated estimate of the second field:
identifying the code applied to the first field based solely on the generated estimate of the second field; or
identifying the code applied to the first field based on the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes;]
identifying the code applied to the first field based on a selected one of the generated estimate of the second field or a combination of the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes, wherein selection is based on a confidence in the generated estimate of the second field; and
decoding the received signal according to the identified code to produce an estimate of the first field.

13. (Amended) A method according to Claim 12:
wherein said step of identifying the code applied to the first field [based on the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes] comprises the steps of:

decoding the received signal according to respective codes of the set of codes; and
generating respective likelihood metrics for the respective decodings of the received signal according to the respective codes of the set of codes.

17. (Amended) A method according to Claim 12, wherein said step of identifying the code applied to the first field [based on the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes] comprises the step of biasing

a selection of a code from the set of codes based on prior communication between the first station and a second station that transmitted the signal that occurred prior to reception of the signal at the first station.

19. (Amended) A method according to Claim 12, wherein the first field is coded according to a channel code of a set of channel codes and is modulated according to a modulation code of a set of modulation codes, wherein the second field indicates the channel code and the modulation code applied to the first field, and wherein said step of identifying the code applied to the first field [based on the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes] comprises the steps of:

generating respective likelihood metrics associated with demodulating and decoding the received signal according to respective combinations of ones of the set of modulation codes and ones of the set of channel codes; and

identifying the channel code and the modulation code applied to the first field based on the generated estimate of the second field and the generated likelihood metrics.

20. (Amended) A method according to Claim 12, wherein the first field is coded according to a channel code of a set of channel codes and is modulated according to a modulation code of a set of modulation codes, wherein the second field indicates the channel code and the modulation code applied to the first field, and wherein said step of identifying the code applied to the first field [based on the generated estimate of the second field and respective likelihood metrics associated with decoding the received signal according to respective codes of the set of codes] comprises the steps of:

generating respective likelihood metrics associated with demodulating the received signal according to respective modulation codes of the set of modulation codes;

identifying the modulation code applied to the first field based on the generated estimate of the second field and the generated likelihood metrics associated with demodulating the received signal according to respective modulation codes of the set of modulation codes;

demodulating the received signal according to the determined modulation code;

generating respective likelihood metrics associated with decoding the demodulated signal according to respective channel codes of the set of channel codes; and

identifying the channel code applied to the first field based on the generated estimate of the second field and the generated respective likelihood metrics associated with decoding the demodulated signal according to respective channel codes of the set of channel codes.

21. (Amended) A method of processing a signal representing information coded according to a code selected from a set of codes, the method comprising the steps of:

receiving the signal at a first station;

determining an extent to which to decode the received signal based on a [prior] communication between the first station and a second station that transmitted the signal that occurred prior to reception of the signal at the first station;

decoding the received signal according to respective codes of the set of codes to the determined extent to generate respective likelihood metrics associated with respective codes of the set of codes;

selecting a code from the set of codes based on the respective likelihood metrics; and

decoding the received signal according to the selected code to generate an estimate of the information.

31. (Amended) A wireless station, comprising:
a receiver that receives a signal representing information coded according to a code selected from a set of codes, that decodes the received signal according to respective codes of the set of codes to generate respective likelihood metrics associated with respective codes of the set of codes and that selects a code from the set of codes based on the respective likelihood metrics, and that decodes the received signal according to the selected code to generate an estimate of the information, wherein the selection of the code from the set of codes is biased based on [prior] a communication between the wireless station and a station that transmitted the signal that occurred prior to reception of the signal.

45. (Amended) A wireless station for processing a signal representing information coded according to a code selected from a set of codes, the wireless station comprising:

a receiver that receives the signal, that determines an extent to which to decode the received signal based on a [prior] communication between the wireless station and a station that transmitted the signal that occurred prior to reception of the signal, that decodes the received signal according to respective codes of the set of codes to the determined extent to generate respective likelihood metrics associated with respective codes of the set of codes, that selects a code from the set of codes based on the respective likelihood metrics, and that decodes the received signal according to the selected code to generate an estimate of the information.

51. (Amended) A wireless station for processing a signal representing information coded according to a code selected from a set of codes, the wireless station comprising:

means for receiving the signal;
means for decoding the received signal according to respective codes of the set of codes to generate respective likelihood metrics associated with respective codes of the set of codes;

means for selecting a code from the set of codes based on the respective likelihood metrics, wherein the selection of the code from the set of codes is biased based on a [prior] communication between the wireless station and a station that transmitted the signal that occurred prior to reception of the signal; and

means for decoding the received signal according to the selected code to generate an estimate of the information.

63. (Amended) A wireless station for processing a signal representing information coded according to a code selected from a set of codes, the wireless station comprising:

means for receiving the signal;

means for determining an extent to which to decode the received signal based on a [prior] communication between the wireless station and a station that transmitted the signal that occurred prior to reception of the signal;

means for decoding the received signal according to respective codes of the set of codes to the determined extent to generate respective likelihood metrics associated with respective codes of the set of codes;

means for selecting a code from the set of codes based on the respective likelihood metrics; and

means for decoding the received signal according to the selected code to generate an estimate of the information.

64. (Amended) A wireless station according to Claim 63, wherein the means for determining an extent comprises means for determining the extent to which to decode the received signal based on [a] at least one of:

a measure of channel quality[,];

a communications status report[,];

a state of a communications transaction between the wireless station and the station that transmitted the signal[,]; and

an extent to which a previously received signal was decoded.